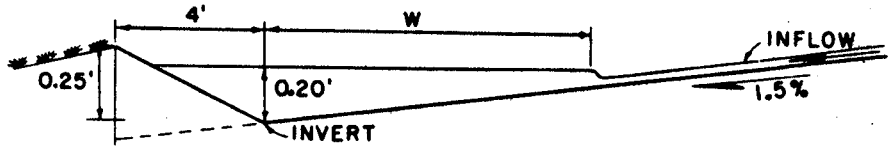
CHAPTER 21

GUTTERS

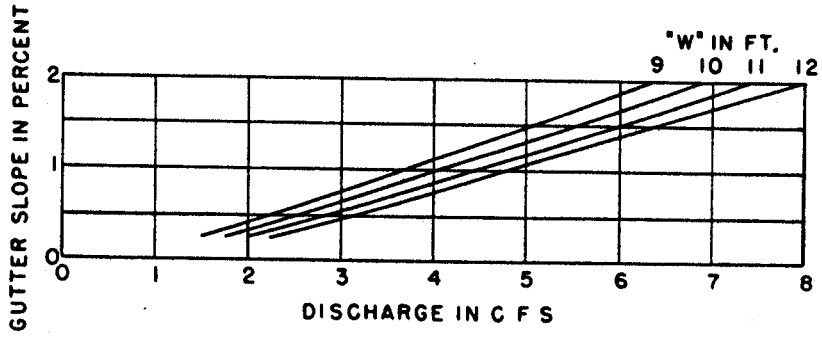
21-1. General. The use of gutters for mobilization construction, even when deferred is discouraged. However, the use of shallow paved gutters may prove to be an expedient solution to a drainage problem or an effective remedial action under deferred conditions. Gutters should be considered for special cases only not as a standard plan of street, road, or airstrip design.

21-2. Discharge capacity. The discharge capacity of gutters depends on their shape, slope, and roughness. Manning's equation may be used for calculating the flow in gutters; however, the roughness coefficient n must be modified somewhat to account for the effect of lateral inflow from the runway. The net result is that the roughness coefficient for the gutter is slightly higher than for a normal surface of the same type. The assumption of uniform flow in gutters is not strictly correct since runoff enters the gutter more or less uniformly along its length. The depth of flow and the velocity head increase downslope in the gutter, and the slope of the energy gradient is therefore flatter than the slope of the gutter. The error increases rapidly as the gutter slope is flattened, and on very flat slopes the gutter capacity is much less than that computed using the gutter slope in the Manning equation.

21-3. Design charts. A cross section of a typical runway gutter and the design charts are shown in figure 21-1. Safety and operational requirements for fast-landing speeds make it desirable to provide a continuous longitudinal grade in the gutter conforming closely to the runway gradient thereby minimizing the use of sumped inlets. A sufficient number of inlets will be provided in the gutter to prevent the depth of flow from exceeding about 3 inches.



TYPICAL GUTTER SECTION
FOR ARMY AIRFIELDS



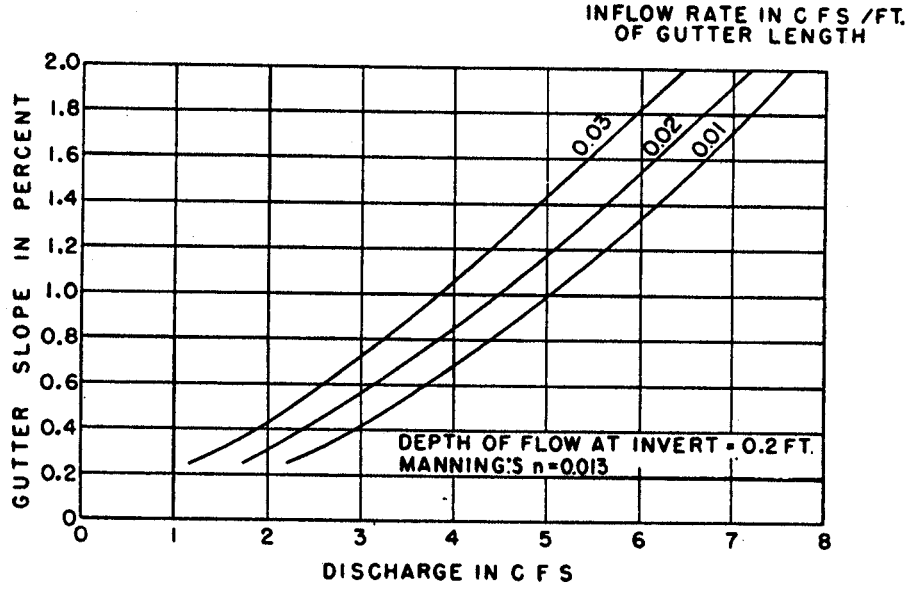


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FIGURE 21-1. DRAINAGE GUTTERS FOR RUNWAYS AND APRONS